

nature, and to see whether any real material towards the final solution of the great question of the origin of species can be derived therefrom. Mr. Wollaston, in accordance with his known views, holds that these changes (if such have taken place) will have been effected *rapidly*. Whatever conclusion may be arrived at upon this subject, no one will doubt that in his present work and its companion, the 'Coleoptera Atlantidum,' Mr. Wollaston has furnished a most important contribution to philosophical zoology.

*Naturhistorisk Tidsskrift (Journal of Natural History)*, edited by Professor J. C. SCHIÖDTE, at Copenhagen. Third Series, vols. iii. & iv. (1865-1867), 568 pages with 15 plates, and 552 pages with 22 plates.

J. C. SCHIÖDTE on Phthiriasis; on the genus *Stalita*; on the Classification of *Buprestes* and *Elateres*; on some Tunnelling Coleoptera; on the Structure of the Mouth in Sucking Crustacea, and on the Metamorphoses of Coleoptera.—Dr. R. BERGH, Contributions to a Monograph of Pleurophyllididæ.—Dr. V. BERGSÖE on *Philichthys Xiphie*, St.; on the Italian *Tarantula* and Tarantism.—Dr. BERGSÖE and Dr. MEINERT on the Danish Species of *Geophili*.—Dr. MEINERT on Campodæ; on *Miastor metraloas* (three articles).—M. FISCHER on the Egg of *Caryocatactes guttatus*; on *Larus Rossii* and on *Syrnhaptes paradoxus*.—M. STRÖM on the Danish Species of *Orgyia*; List of Danish Lepidoptera.

THE third and fourth volumes of this periodical, which have just been completed, are in every way worthy of their predecessors, which were noticed in the 'Annals' (ser. 3. vol. xv. p. 475). They consist entirely of original papers by Danish naturalists, and are admirably illustrated by engraved plates. Several of the papers above mentioned have been translated or excerpted in English or other continental periodicals. Prof. Schiödte's papers on Phthiriasis, *Elateres* and *Buprestes*, tunnelling Coleoptera, and sucking Crustacea have been translated in the 'Annals,' as well as Dr. Meinert's papers on Campodæ and his observations on those remarkable larvæ of Cecidomyiæ which exhibit alternating generations, and on generation generally; whilst M. Fischer's discovery of the true egg and nest of *Caryocatactes* has been communicated to English ornithologists through the 'Ibis.' But there remain several papers well worthy of attention.

The volumes before us contain two further instalments (vol. iii. p. 131, and vol. iv. p. 415) of Prof. Schiödte's memoir "De Metamorphosi Eleutheratorum Observationes," which has now grown up to 279 pages of text and 31 plates, and is still being continued. The larvæ as yet described amount to 100, belonging to 57 genera of the families of Carabi, Dytisci, Gyrini, Hydrophili, Silphæ, Histri, and Staphylini, and representing the principal groups of these families, except the last, which is not yet completed. A few of these larvæ have been described before, but mostly in loose and general terms; and it may well be said that never have the larvæ of any insects been the subject of such complete and accurate investigation

and illustration. Almost everything in this memoir is therefore new; and it would be so much the more difficult to make a suitable extract from the host of new observations, as, in spite of the great mass of detail, nothing has been included in the descriptions but what really has scientific value. It is an exceedingly difficult task, in commencing the study of a new branch, to limit properly the detail to be inserted in the descriptions, because experience alone can show what has systematic and philosophical value, and what not. But in the memoir before us the matter seems to have been prepared so long and weighed so carefully that there is nothing superfluous, nothing that does not really serve to complete our conception of the animals. One question, however, may fairly be asked, viz., What light do these investigations throw on the systematic relations of the families to which the larvæ belong? And a few leading results may easily be pointed out. The new division of the family of Carabi, proposed by Prof. Schiödte some years ago (Ann. Nat. Hist. ser. 3. vol. x. p. 380), and based on the development of the epimera metathoracica and the position of the antennæ &c., is fully borne out by the larvæ, particularly the union of Carabini, Elaphrini, and the anomalous genus *Loricera*, Latr., into one natural group. The close relationship of Carabi, Dytisci, and Gyrini, which form such a well-defined group at the head of the order, finds an expression in the fact that their larvæ possess true, almost invariably double, claws, with proper apparatus of muscles, whilst the larvæ of all other families have only a "tarsus unguiformis." The union of Silphæ and Anisotomæ is also strongly supported by the similarity of the larvæ; and the received division of Dytisci and Hydrophili into groups is likewise most markedly expressed in the larvæ. The larvæ of Haliplini are distinguished from those of the other groups not only by their dorsal segments being armed with spines, which gives them a very grotesque appearance, but by their possessing only one claw, whilst all others have two, and by their anal segment (which is rudimentary in all other Dytisci) being enormously elongated and bifurcate, so that the anus is placed on the underside of this peculiar tail, and the spiracles of the eighth pair, which are terminal and tubiform in other Dytisci, here become lateral and quite plain. The larvæ of Hydroporini are all distinguished by the production of their forehead so as to form a kind of horn, against the under surface of which the mandibles, being very long and curved upwards, work, whereby they are enabled to keep their prey very firm while sucking it out; they are also swift swimmers, thanks to the shape of their body and their (usually) ciliated legs. Then follow the well-known larger larvæ of *Dytiscus*, with large, free, round heads, narrow prothorax forming a kind of neck, and ciliated abdomen. Still greater variety is met with amongst Hydrophili, beginning with the amphibious larvæ of *Helophorus* (which catch their prey running), whose lateral abdominal appendages are stiff and adapted for supporting their crawling movements, and who are also destitute of the peculiar hairy or felty covering which enables the larvæ of *Hydrophilus* and others to carry with them a supply of air surrounding their

body when diving, instead of which the peritreme of the spiracles in *Helophorus* is dilated and so arranged that a small quantity of air will adhere to it. In the larvæ of *Hydrophilus* the lateral appendages of the abdomen are soft, flexible, ciliated, and assist in buoying up the heavy fleshy body of the larva (for which purpose even the antennæ are ciliated); but they do not serve for respiration as in the larvæ of *Berosus*, where they form true branchiæ of considerable size. In this last genus the terminal (eighth abdominal) pair of spiracles, which in the family of Hydrophili are usually very large and lead into a capacious air-chamber, are accordingly very minute, and the air-chamber is wanting. In the larva of *Hydrous* these lateral appendages are very small; and they are entirely wanting in the larvæ of *Hydrobius* and of *Philhydus*, which simply walk about on submerged objects, the latter even assisted by five pairs of abdominal feet. In the larvæ of *Cercyon* and *Sphæridium*, which represent the Hydrophiline type modified for life on dry land (though in humid places), we find neither lateral abdominal appendages nor even true feet, the animal wriggling its way through the débris amongst which it lives, whilst the last abdominal segment is the largest of all, and often armed with hooks. In the family of Staphylini a remarkable division presents itself, separating the family into two main parts,—one of which comprises the typical forms of the family, the group of Staphylinini; whilst the other embraces all the remaining groups, of which, however, only Oxytelini find a place in the portion of the memoir as yet published. But regard to space forbids our extracting more details or entering upon the general considerations which are largely suggested by the contents of this memoir, of which the above gives but a very inadequate idea; and we shall only add that nothing can be more varied than the succession of beings represented on the plates, or more instructive than the mode in which the author has handled the enormous mass of new and interesting details which he has observed.

In his present paper on *Stalita* (vol. iii. p. 70), Prof. Schiödte recurs to an observation made by him in a paper on the classification of Cerambyces, in Nat. Tids. ser. 3. vol. ii. p. 483 (Ann. & Mag. Nat. Hist. ser. 3. vol. xv. pp. 182, 183), to the effect that Arthropoda exhibit analogous variations with regard to the manner in which they tread the ground to those observed amongst Vertebrata, especially Mammalia; so that amongst them, too, we find plantigrade, digitigrade, and unguligrade groups, which are distinguished by analogous modifications in the development and outer appearance of the different parts of the limbs. "The true key," says he, "to the differences in structure between the leg of an insect and that of a spider, to the manner in which the respective divisions of the leg participate in the building up of the limb, and to their relative position, size, and shape, lies in the circumstance that spiders are digitigrade. If we thoroughly appreciate this, we shall also admit that the nomenclature now in use is faulty. In order to enable the spider to tread on the under surface of the point of the foot, that part of the leg which is outside and below the knee re-

quires several inward bends; and in order to give the movement the necessary softness and elasticity, without detriment to the carrying-power of the limb, these bends must follow each other with short intervals near both extremities of this line (*i. e.* just below the knee and near the point of the foot). This arrangement therefore necessitates that the first division under the knee should be much shorter in spiders than in insects; for whilst in insects, being plantigrade, this division constitutes the only lever for carrying the weight of the body, it forms in spiders, which are digitigrade, only the uppermost section of a compound lever, consisting of a succession of joints, each carrying a part of the burden. But this first division below the knee is the tibia, and it ought not to change name only because its size and the manner in which it enters into the composition of the leg are changed. That division of the leg, therefore, which araneologists call 'patella' is the true tibia, and what they call the tibia is the first joint of the tarsus lifted up from the ground." That is to say, Prof. Schiödte proposes that we should cease making a mistake with regard to spiders similar to that popularly committed with regard to horses and other Mammalia, whose wrists are called knees, and whose so-called shanks are merely the metacarpal portion of the foot raised from the ground and simulating a tibia. The genus *Stalita* was first established by Schiödte in his 'Specimen Faunæ Subterraneæ,' in which he described a series of remarkable Insects, Arachnida, and Crustaceans, discovered by him in the caves of Adelsberg in 1845, and wonderfully adapted in conformity with their life in darkness and on the stalactites. Since then, the cave-fauna has been carefully studied, without, however, adding much to our knowledge. The present paper on *Stalita* has been caused by a memoir of Count Keyserling in the 'Transactions of the I. R. Zoological and Botanical Society of Vienna' for 1862, on a new cave-spider (*Hadites tegevaria*) from Lessina, in Dalmatia, in which the author, having also received some female *Stalitas* from that locality, submits Schiödte's original account of *Stalita* to a severe criticism. Alluding to two figures in the Spec. Faun. Subt., viz. fig. 3 *c* and fig. 3 *d*, pl. 2, he says that they are intended to represent the same parts of the mouth in the two sexes of *Stalita tænarica*, but that the difference is so great that Schiödte must have confounded two species. He regrets that Schiödte has not described the female, but only figured some parts of its mouth; and, on the supposition that his own *Stalitas* from Lessina belong to the same species as Schiödte's from Adelsberg, he proceeds to give what he thinks a more accurate description of these animals than is found in the 'Spec. Faun. Subt.' Unfortunately for his criticism, a reference to the figures in question shows that they represent, not the same, but utterly different parts of the mouth of the two sexes of *Stalita tænarica*, fig. 3 *c* being described as "maxilla feminae dextra cum labro palpoque maxillari, supra, decies aucta," and fig. 3 *d* as "maxilla maris sinistra, cum labio sternali inferne visa, sedecies aucta;" that is to say, one represents the upper lip from above in the female, the other represents the lower lip of the male from beneath, as indeed an able araneo-

logist ought to have seen even without reference to the explanation. There is consequently not the slightest vestige of the alleged confusion on Schiödte's part; and the Latin description of *S. tenaria* comprises evidently both sexes, which, apart from the ordinary sexual differences expressly referred to, are exactly alike. Nor can there be much doubt, if Count Keyserling's description be correct, that his specimens from Lessina belong not to *S. tenaria* as he thinks, but to a new and different species. Count Keyserling's new account of *Stalita* is therefore only calculated to create considerable confusion; and his considerations on the relations of *Stalita* to other genera are not without grave errors. He says, for instance, that *Stalita* differs from *Dysdera* by having three foot-claws, and by the palpi of the female terminating in a claw. But neither *Stalita* nor any other genus of Arthropoda has really three claws, though the claw-shaped onychium may give it such an appearance at first sight, as remarked by Schiödte in his first memoir; in *Dysdera* the onychium is soft, round, and hairy. Nor does the female *Dysdera* lack a terminal claw on its palpi, though Count Keyserling may have overlooked it. The last-named author also mentions as remarkable that the patellæ are much elongated in *Stalita*, the fact being, however, on the contrary, that, whilst all the other parts of the limbs are much elongated in *Stalita*, the patellæ do not participate in this modification, but remain comparatively short; and it is by way of showing the reason of this circumstance that Prof. Schiödte enters upon the general considerations above quoted.

The family of Geophili is easily distinguished from the other families of Chilopoda; but, although there is in reality no lack of good distinctive characters for genera and species, the attempts hitherto made at a natural classification of its contents have not been successful; and the authors of the paper on Danish Geophili (iv. p. 81), Dr. Meinert and Dr. Bergsøe, have been able to suggest very considerable improvements. We refer for details to their Latin diagnoses; but some general remarks may not be unacceptable. They derive good systematic characters not only from the organs of the mouth (with regard to which they follow Savigny's nomenclature), but also from the composition of the head. For species living more on the surface, firmer and more completely chitinized integuments are necessary than for those which are constantly hidden under stones, fallen leaves, &c.: accordingly it is found that in some the skull consists of one piece only, but in others it is divided into two pieces, a crown piece and a smaller front piece. Generally the posterior margin of the skull reaches the tergum of that segment which carries the second pair of maxillary feet (segmentum basilare, Newport), and even covers the anterior margin of that segment; so that the tergum of the intervening segment, which carries the first pair of maxillary feet, is entirely hidden from view. But in *Scoliopterus*, a new genus, this generally hidden segment is quite free, and its tergum even divided into two plates more or less widely distant from one another. The number of the legs is a useful character, though it varies within certain limits. In males the average num-

ber of pairs of legs is always two less than the average number of pairs in the females. The number of pairs, counting the anal pair, is invariably uneven, and all variations, according to species, sex, variety, are produced by subtraction or addition of an even number. The authors consider it settled beyond doubt that the young *Geophili* at once possess the full number of segments and legs: not only have quite young specimens taken with their mothers presented the same number as the adult, but such specimens just hatched have been observed with a greater number of legs than is generally found in the adult. The pores of different kinds—ventral pores (on the ventral segments), the pleural pores (on the pleuræ of the last joint which carries limbs), and the anal pores (on the last protruding apodal segment)—also afford good characters; but their number increases considerably as the animals grow in size. The colour is of very little value; the designs produced by the intestines shining through the integuments vary according to the state of feeding; and the intensity of the usually darker colour of the claws depends principally on the time which has elapsed since the last moulting. The length of the body and of the antennæ is not without importance, but varies according to the mode in which the animal is killed and preserved; and the characters derived from the shape of the individual joints are by far more valuable. The authors propose a new genus, *Scnipæus*, distinguished from *Geophilus* by the absence of anal pores, by having a smaller toothless claw on the first pair of maxillary legs, a larger second pair of maxillæ, thicker anal limbs in the male, and by the skull-plate being divided. They enumerate five species of *Geophilus* as Danish, of which one is new,—and two of *Scnipæus*, probably both new. They reject Koch's genera *Linotænia* and *Stenotænia*, because the principal mark of distinction between them, the varying thickness of the anal legs, is in most species a sexual distinction; and they consider the species of *Stenotænia* to be the females of corresponding males described as species of *Linotænia*. They also reject both names, as being formed in direct violation of the rules of nomenclature, and in any case only applicable to congeners of *Tænia*. The species in question are united in the new genus *Scolioplanes*, of which they enumerate three species as Danish. They propose a new genus, *Schendyla*, based on Koch's *Linotænia nemorensis*, and distinguished from *Scolioplanes* by the labrum being united to the clypeus, the cutting-edge of the mandibles short, with but few teeth; the maxillæ of the second pair are small, but the claw of the first pair of maxillary legs is exceedingly large, and the anal legs, even in the female, very thick. *Himantarium subterraneum*, K., is also mentioned as Danish.

Dr. Bergsøe's paper on the *Tarantula* (iii. p. 239) and the curious phenomena of Tarantism contains a careful and interesting examination of the voluminous literature of the subject, proving that the term "tarantism" has been applied to facts of entirely different nature, which, thanks to popular superstition and ignorance, have been confounded with and all ascribed to the poisonous wounds



inflicted by certain animals, though in reality only a small minority can be so explained. He points out a strong analogy between mediæval tarantism and the dancing manias which have visited several parts of Europe at different periods; and he considers it very probable that a similar epidemic developed itself independently in Italy, and that only superstition ascribed it to the various kinds of "tarantola." But Dr. Bergsøe does not think that this explanation exhausts the question. He is of opinion that a very large part of these phenomena are to be ascribed to a kind of local fever generated by the highly unhealthy exhalations from the soil of Apulia, and that the subjects of this kind of tarantism (which still occurs not unfrequently in Apulia) were simply the victims of malaria. This view of the matter explains why tarantism was so rare out of Apulia, although tarantulas occur in most parts of Italy,—a circumstance which has not failed to puzzle the ancient writers on the subject, and led them into various unreasonable hypotheses—for instance, that the animals lost their venomous properties by removal from their native soil. Finally, the undoubted poisonous properties of the wounds inflicted by some of the various (sometimes, however, quite harmless) animals comprised under the popular name of "tarantula" (particularly by the well-known spider of that name, by scorpions, probably also by *Scolopendras*), may account for some of the lighter cases of tarantism; but it is only want of hygienic knowledge combined with the instinctive dread, common with uneducated people, of small, strangely shaped, creeping animals, which has caused so many different phenomena of disease to be ascribed to their agency. Dr. Bergsøe gives an interesting account of the habits of life of the true Tarantula, which certainly does not favour the idea of its coming easily in contact with men; and he mentions several hitherto overlooked peculiarities of structure, of which we note the existence of special provisions for facilitating the carrying of the young on the back of their mother. Not only are the claws and their five teeth in the young proportionally very long and sharp, but the hairs forming the felt-like covering on the back of the female Tarantula are specially constructed for the purpose, consisting as they do of a basal bulb, a short smooth stem, surmounted by a much longer part covered with stiff spinules or bristles pointing upwards, and terminating in a very minute rounded head or button. The hairs on the legs present a similar structure, but are much softer and without the terminal button; but the long stiff hairs interspersed with the felt on the back are quite plain; nor is this complicated structure observed in the hairy covering of the male.

*Philichthys Xiphice*, Steenstr., was first discovered by the late Prof. Eschricht on the head of a *Xiphias gladius*, L., and briefly described by Prof. Steenstrup, who also drew attention to the probability of its frequent occurrence as a parasite of that fish, in certain cavities connected with the muciparous canals on the head. He was, however, unable to assign it a place in the zoological system, on account of its extraordinarily deformed appearance, which led him to suggest that it might belong to the class of Annelida. This

hypothesis, however, he abandoned, another specimen of *Xiphias gladius* having been taken in the Sound in the autumn of the following year, on the head of which the same parasite was observed, in a similar cavity, but accompanied by a small Entomostræon. Assuming this to be either the male or the young of the larger parasite, Prof. Steenstrup inferred from that circumstance that the latter was a Crustacean; but he did not enter into any further description. Meanwhile Dr. Bergsøe had availed himself of a stay on the shores of the Mediterranean for an investigation of the history of this remarkable animal; and the results are embodied in the paper above mentioned (iii. p. 87), to which is added a Latin *résumé* for those who do not understand Danish. The details of the structure are apparent from the very full description and the plate; and from these the author concludes that the proper place of the animal is amongst the Copepoda nearest Ergasilini, though at the same time he expresses the expectation that, when other similar parasites have been discovered, they will be found to constitute a new family. He gives besides a very minute account of the cavities in which the animal is found. It appears that the female fixes itself in a convenient place in the muciparous canals on the head; and by degrees, as the animal grows, the cavity grows with it. Where the canal is close to the surface of the skull, large cavities are formed in the bones; and in these cases the skin covering them and protecting the parasite is thin and perforated. But where the cavities containing the *Philichthys* are developed in parts of the muciparous canals not in contact with the bones, they are generally smaller, and the integuments thick and without perforations. The cavities rarely contain more than one female attended by a male. In any case the cavities are easily observable from without; and the fishermen of Messina are well aware of the parasite, which they call "Pulce." Dr. Bergsøe recommends the examination of other large fishes of the Mediterranean, such as the different species of *Thynnus*, *Histiophorus*, *Tetrapturus*, *Belone*, as he expects that similar parasites will be found in them. The *Philichthys* affords one of the very few instances of a parasitic Crustacean living entirely inside the body of its host, though its choice of abode, considering how much communication there is between the muciparous canal and the outside, is not without analogy with the habits of those numerous parasitic crustaceans met with in the branchial cavities of fishes.

Dr. Bergh, who for many years past has occupied himself with the study, and more particularly the anatomy, of Mollusca, and published several valuable papers on the subject, has contributed to the fourth volume of the 'Naturhistorisk Tidsskrift' (pp. 1 & 207) a monograph of the family of Pleurophyllididæ, embracing the substance of some smaller papers previously published, but containing a far greater quantity of new matter. The number of species described is seventeen, of which six are established by Dr. Bergh, belonging to the genera *Pleurophyllidium*, Meckel, *Sancara*, Bergh, and *Camarga*, Bergh. Having been favoured with specimens for dissection, both from private collections and from the museums of



Copenhagen, Berlin, and Stuttgart, he has been enabled to present an exceedingly full account of the anatomy of these hitherto little-known animals, in which very many new facts will be found, but which space forbids us to extract. The diagnoses are all in Latin, as well as the explanation of the plates (nine in number), containing anatomical details.

M. Ström's papers on Danish Lepidoptera (iii. pp. 1 & 107; iv. p. 381) contain several observations of more than merely faunistic interest, of which we can only find room for one. He points out a gradual degradation, as it were, in the females of *Orgyia antiqua*, *gonostigma*, and *Ericce*, corresponding to peculiarities in their development, the antennæ being dentated in the first, crenulated in the second, but much shorter and merely filiform in the third; the rudimentary wings are closely covered with hair in the first, sparsely haired in the second, exceedingly small and naked in the third; and the legs show a similar gradation. Accordingly he has found that the female of *O. antiqua* entirely disengages herself from the double cocoon, and places her eggs on the outside of it; whilst that of *O. gonostigma* only perforates the inner cocoon, and remains hidden behind the outer cocoon, which forms a sort of curtain, leaving a sufficiently large opening to admit the male; and the female of *O. Ericce*, finally, never leaves the pupa-skin, just as is the case with some species of *Psyche*. Probably, in order to facilitate the fecundation, the pupa is placed in an inverted position in the cocoon, which is found in the tops of the heath.

*The Record of Zoological Literature*, 1866. Volume III. Edited by ALBERT C. L. G. GÜNTHER, M.A., M.D., Ph.D., F.R.S. &c. Van Voorst, 1867.

In consequence of the illness of one of the Recorders, the volume of 'The Zoological Record' for the literature of 1866 was published at a later period than usual. "An undertaking of this kind," it is observed in the preface, "must, of necessity, be occasionally exposed to the danger of such a delay without the Editor having it in his power to guard against it."

Each year that this work comes to us we feel more and more its extreme usefulness. Without some such help as that afforded by this volume it is impossible for the zoological student to keep up with the literature of the day. The number of investigators in every branch of natural history is year by year increasing; the works published, in all languages, multiply in like proportion; many of them are extremely difficult to procure through a bookseller, and not to be found in our best public libraries; and periodicals devoted to natural history in general or to some particular class, and Transactions and Proceedings recording the investigations of the members of the rapidly increasing number of scientific societies, render the attempt of the individual worker to keep himself acquainted with all that is being written almost hopeless. Here, then, the 'Zoological Record' comes